

Appl. No. 10/708,295
Amdt. dated June 27, 2005
Reply to Office action of May 12, 2005

Amendments to the Claims

Listing of Claims:

Claim 1 (Currently Amended): A low-to-high level shifter operating under a first
5 supply voltage, the low-to-high level shifter comprising:
a pull-down circuit coupled to an input signal, the input signal corresponding to a
second supply voltage;
a pull-up circuit coupled to the pull-down circuit; and
a clamping circuit coupled to the pull-down circuit, for clamping an operating
10 voltage of the pull-down circuit;
wherein the low-to-high level shifter generates an output signal according to the
input signal, the output signal corresponds to the first supply voltage, and the
first supply is larger than the second supply voltage[.];
15 wherein the pull-down circuit comprises a plurality of low-voltage devices, and the
pull-up circuit comprises a plurality of high-voltage devices.

Claim 2 (Cancelled)

Claim 3 (Currently Amended): The low-to-high level shifter of claim [[2]] 1 wherein the
20 low-voltage devices have a lower turn-on characteristic than the high-voltage
devices.

Claim 4 (Original): The low-to-high level shifter of claim 1 wherein the pull-down circuit
comprises a first pull-down transistor and a second pull-down transistor, control
25 terminals of the first and the second pull-down transistors are coupled to the input
signal.

Claim 5 (Original): The low-to-high level shifter of claim 1 wherein the pull-up circuit

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comprises a first pull-up transistor and a second pull-up transistor, a control terminal of the first pull-up transistor is coupled to a first terminal of the second pull-up transistor, and a control terminal of the second pull-up transistor is coupled to a first terminal of the first pull-up transistor.

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Claim 6 (Original): The low-to-high level shifter of claim 5 wherein the output signal is extracted from the first terminal of the first pull-up transistor.

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Claim 7 (Original): The low-to-high level shifter of claim 5 wherein the first terminals of the first and the second pull-up transistors are coupled to the pull-down circuit.

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Claim 8 (Original): The low-to-high level shifter of claim 1 wherein the clamping circuit comprises a first clamping transistor and a second clamping transistor, control terminals of the first and the second clamping transistors are coupled to a bias voltage.

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Claim 9 (Original): The low-to-high level shifter of claim 1 wherein the input signal is coupled to the pull-down circuit via an inverter operating under the second supply voltage.

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Claim 10 (Original): A low-to-high level shifter operating under a first supply voltage, the low-to-high level shifter comprising:
a pull-down circuit coupled to an input signal, the pull-down circuit comprising a plurality of low-voltage devices, the input signal corresponding to a second supply voltage; and
a pull-up circuit coupled to the pull-down circuit, the pull-up circuit comprising a plurality of high-voltage devices;
wherein the low-to-high level shifter generates an output signal according to the

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input signal, the output signal corresponds to the first supply voltage, and the first supply voltage is larger than the second supply voltage.

5 Claim 11 (Original): The low-to-high level shifter of claim 10 further comprising:
 a clamping circuit coupled to the pull-down circuit, for clamping an operating
 voltage of the pull-down circuit.

10 Claim 12 (Original): The low-to-high level shifter of claim 11 wherein the clamping
 circuit comprises a first clamping transistor and a second clamping transistor,
 control terminals of the first and the second clamping transistors are coupled to a
 bias voltage.

15 Claim 13 (Original): The low-to-high level shifter of claim 10 wherein the pull-down
 circuit comprises a first pull-down transistor and a second pull-down transistor,
 control terminals of the first and the second pull-down transistors are coupled to the
 input signal.

20 Claim 14 (Original): The low-to-high level shifter of claim 10 wherein the pull-up
 circuit comprises a first pull-up transistor and a second pull-up transistor, a control
 terminal of the first pull-up transistor is coupled to a first terminal of the second
 pull-up transistor, and a control terminal of the second pull-up transistor is coupled
 to a first terminal of the first pull-up transistor.

25 Claim 15 (Original): The low-to-high level shifter of claim 14 wherein the output
 signal is extracted from the first terminal of the first pull-up transistor.

 Claim 16 (Original): The low-to-high level shifter of claim 14 wherein the first
 terminals of the first and the second pull-up transistors are coupled to the pull-down

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circuit.

Claim 17 (Original): The low-to-high level shifter of claim 10 wherein the input
signal is coupled to the pull-down circuit via an inverter operating under the second
5 supply voltage.

Claim 18 (Original): The low-to-high level shifter of claim 10 wherein the
low-voltage devices have a lower turn-on characteristic than the high-voltage
devices.

10 Claim 19 (New): A low-to-high level shifter operating under a first supply voltage, the
low-to-high level shifter comprising:
a pull-down circuit coupled to an input signal, the pull-down circuit comprising a
plurality of first-voltage devices, the input signal corresponding to a second
15 supply voltage; and
a pull-up circuit coupled to the pull-down circuit, the pull-up circuit comprising a
plurality of second-voltage devices;
wherein the low-to-high level shifter generates an output signal according to the
input signal, the output signal corresponds to the first supply voltage, and the first
20 supply voltage is larger than the second supply voltage;
wherein the first-voltage devices and the second-voltage devices have different
threshold voltages.

Claim 20 (New): The low-to-high level shifter of claim 19 further comprising:
25 a clamping circuit coupled to the pull-down circuit, for clamping an operating
voltage of the pull-down circuit.

Claim 21 (New): The low-to-high level shifter of claim 20 wherein the clamping circuit

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comprises a first clamping transistor and a second clamping transistor, control terminals of the first and the second clamping transistors are coupled to a bias voltage.

- 5 Claim 22 (New): The low-to-high level shifter of claim 19 wherein the first-voltage devices comprise a first pull-down transistor and a second pull-down transistor, control terminals of the first and the second pull-down transistors are coupled to the input signal.
- 10 Claim 23 (New): The low-to-high level shifter of claim 19 wherein the second-voltage devices comprise a first pull-up transistor and a second pull-up transistor, a control terminal of the first pull-up transistor is coupled to a first terminal of the second pull-up transistor, and a control terminal of the second pull-up transistor is coupled to a first terminal of the first pull-up transistor.

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